We claim:

1   1.   A method for antenna tracking, comprising:

2   determining complex weightings for matching a polarization of an incident signal on

3   a data channel; and

4   applying the complex weightings to a tracking channel such that an antenna system

5   polarization is matched to the polarization of the incident signal.

1   2.   The method for antenna tracking of claim 1, wherein the complex weightings

2   are determined such that a signal power of the incident signal is maximized.

1   3.   A method for antenna tracking, comprising:

2   deriving complex weighting values that match a polarization of an incident signal on

3   a data channel; and

4   applying the complex weighting values and time variations of the complex weighting

5   values to a tracking channel to replicate the polarization of the incident signal over time.

1   4.   A system for antenna tracking, comprising:

2   means for measuring a polarization of an incident signal on a data channel and for

3   determining an amplitude and phase combination that matches the polarization; and

4   means for applying the amplitude and phase combination to a tracking channel

5   responding to variations in the polarization.

1   5.   The system for antenna tracking of claim 4, wherein the means for measuring

2   a polarization of an incident signal on a data channel and for determining an amplitude and

3   phase combination that matches the polarization includes

4   a polarization-matching network.

1   6.   The system for antenna tracking of claim 5, wherein the polarization

2   matching network includes a vector modulator.

1   7.   The system for antenna tracking of claim 5, wherein the polarization

2   matching network includes a diversity combiner.

1   8.   The system for antenna tracking of claim 4, wherein the means for applying

2   the amplitude and phase combination to a tracking channel responding to variations in the

3   polarization includes

4   a polarization-matching network.

1   9.   The system for antenna tracking of claim 8, wherein the polarization

2   matching network includes a vector modulator.

1   10.   The system for antenna tracking of claim 8, wherein the polarization

2   matching network includes a diversity combiner.

1   11.   A method for antenna tracking, comprising:

2   processing orthogonally polarized tracking channel components of an incident signal

3   to make a determination as to which of the orthogonally polarized tracking channel

4   components is stronger; and

5   using the determination to select a polarization of a data channel to reduce a

6   polarization mismatch loss.

1   12.   A method for antenna tracking, comprising:

2   determining which of two orthogonal polarization components of an incident signal

3   is a stronger signal component;

4   determining a polarization mismatch loss for two orthogonal polarization

5   components;

6   weighing a tracking response amplitude by the polarization mismatch loss; and

7   selecting a polarization of a data channel depending upon the stronger signal

8   component.

1   13.   A system for antenna tracking, comprising:

2   means for detecting orthogonally polarized signals of a tracking channel, determining

3   which of the orthogonally polarized signals is stronger, and suppressing a cross polarization

4   response of the tracking channel; and

5   a controller configured to select a polarization of a data channel depending upon

6   which of the orthogonally polarized signals is stronger.

1   14.   The system for antenna tracking of claim 13, wherein the means for detecting

2   orthogonally polarized signals of a tracking channel, determining which of the orthogonally

3   polarized signals is stronger, and suppressing a cross polarization response of the tracking

4   channel includes

5   means for combining the orthogonally polarized signals after the orthogonally

6   polarized signals are detected.

1   15.   The system for antenna tracking of claim 13, wherein the means for detecting

2   orthogonally polarized signals of a tracking channel, determining which of the orthogonally

3   polarized signals is stronger, and suppressing a cross polarization response of the tracking

4   channel includes

5   two tracking receivers configured for detecting the orthogonally polarized signals,

6   respectively, and

7   means for matching tracking amplitude responses of the two tracking receivers.

1   16.   The system for antenna tracking of claim 13, wherein the means for detecting

2   orthogonally polarized signals of a tracking channel, determining which of the orthogonally

3   polarized signals is stronger, and suppressing a cross polarization response of the tracking

4   channel includes

5   a tracking receiver configured to switch between tracking channel inputs for the

6   orthogonally polarized signals and to generate sequential outputs, and

7   a sequential summer configured to receive the sequential outputs and to generate a

8   summed output that is weighed by a polarization mismatch loss of the orthogonally

9   polarized signals.